

## A SERIALY REUSABLE VIRTUAL MACHINE

### ABSTRACT OF THE DISCLOSURE

5           In a virtual machine environment, a method and  
apparatus for the use of multiple heaps to retain  
persistent data and transient data are disclosed. The use  
of multiple heaps enables a single virtual machine to be  
easily resettable, thus avoiding the need to terminate and  
10       start a new Virtual Machine. The use of multiple heaps  
also enables a single virtual machine to retain data and  
objects across multiple applications, thus avoiding the  
computing resource overhead of relinking, reloading,  
reverifying, and recompiling classes that have already been  
15       used by previous applications. The memory hierarchy  
includes a System Heap where classes are loaded, linked,  
verified, initialized and compiled. Subsequent  
applications reuse the classes in the System Heap and need  
not go through the overhead of reloading, linking,  
20       verifying and compiling them again. Applications create  
their persistent or resettable objects in the 'Middleware  
Heap'. The Middleware Heap is garbage collected in between  
applications. Application data that are used only during  
the lifetime of an application are created in the  
25       'Transient Heap'. The Transient Heap is cleared after  
every application. Any objects that are in the Transient  
Heap and are pointed to by objects in the System or

Middleware heap will be moved into the Middleware Heap.  
The use of three heaps enables garbage collection to be  
selectively targeted to one heap at a time (Middleware  
heap) in between applications, thus avoiding this overhead  
5 during the life of an application. This provides greater  
response time to the client of the application. The use of  
the transient heap provides a more efficient method of  
garbage collection (card marking) that enables the Virtual  
Machine to quickly reset the Transient Heap. This provides  
10 greater Virtual Machine throughput.